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ABSTRACT

Problem behaviors during adolescence can include substance use, low educational achievement, delinquent or conduct-disordered behavior, and indiscriminant, precocious, or risky sexual behavior. Despite the dissimilarities of these behaviors, some researchers believe that such actions share common underlying causes, which can be explained by the general-deviance models. This study seeks to replicate the higher-order factor structure of problem behavior and the direct effect of sensation-seeking on that higher-order factor in a large, representative sample of black and white adolescents, aged 13 - 19 years. A random sample of 2,052 black and white adolescents were interviewed and four clusters of problem behaviors were assessed. Results indicate that a single higher-order factor was indeed shown to account for the bulk of the covariation among the first-order problem behaviors. Data also suggest that common causal explanations cannot fully account for the covariation among problem behaviors and a number of alternative explanations are explored. These exceptions notwithstanding, the general deviance model appears to provide an accurate explanation for the covariation among problem behaviors and such models offer important explanatory frameworks for understanding the etiology of problem behaviors. Four models are illustrated and data are displayed in two tables. (RJM)

Covariation among adolescent problem behaviors: What does it mean?

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Externalizing or problem behaviors during adolescence typically encompass a range of phenotypically dissimilar behaviors, including substance use, low educational achievement, delinquent or conduct-disordered behavior, and indiscriminant, precocious, or risky sexual behavior. Despite striking dissimilarities in the outward appearance of these behaviors, a number of researchers have suggested that they share a common underlying cause or causes.

Two discrete lines of evidence lend support to this notion. First, robust associations among these behaviors have been repeatedly observed (see Dryfoos, 1990; Ketterlinus & Lamb, 1994; Ensminger, 1987, for reviews). At the bivariate level, positive relationships have been found between drug use and delinquency (Donovan & Jessor, 1985; Elliot, Huizinga, & Menard, 1989), early sexual intercourse and drug use (Bentler & Newcomb, 1986; Donovan & Jessor, 1985), delinquency and sexual activity (Elliot & Morse, 1987), and drug use and low educational performance (Bachman, O'Malley, & Johnston, 1978; Smith & Fogg, 1978). Donovan and Jessor (1985) were the first, however, to demonstrate that a single common factor was adequate to account for the covariation among a set of manifest (measured) variables assessing problem drinking, marijuana use, sexual behavior, and delinquent-type behavior. Since that time, several investigators have extended this work by showing that a single higher-order factor accounts for the bulk of the covariation among first-order latent variables assessing multiple problem behaviors. For example, McGee and Newcomb (1992) tested a series of hierarchical latent factor models across four developmental stages from early adolescence to adulthood. Using first-order latent factors representing drug use, academic orientation, criminal or delinquent behavior, social conformity, and sexual involvement, these investigators found that a single higher order factor

adequately accounted for the covariation among the first-order factors across several developmental stages. Although such findings are consistent with the interpretation that a common or shared influence (or influences) is responsible for the initiation and maintenance of a range of phenotypically distinct problem behaviors, they shed no light on the nature of these underlying causes.

A second line of evidence that supports the common cause notion derives from a substantial body of literature showing that each of these behaviors, when studied in isolation, exhibits a similar pattern of concomitants or correlates. For example, impulsivity and sensation-seeking have been linked to precocious or indiscriminant sexual behavior (Rosenthal, Muram, Tolley, & Peeler, 1992), alcohol and drug use (Luengo, Carrillo-de-la-Pena, Otero, & Romero, 1994), and delinquency (Hirschi, 1984). Similarly, depression (Blatt, 1991; Jessor et al., 1995), low self-regard (Dryfoos, 1990; Kaplan, 1975), and poor coping skills (Cooper, Frone, Russell, & Mudar, 1995; Wills, 1986) have also been linked to many of these behaviors. Whereas this evidence is consistent with the idea of a single underlying common cause, or a set of common causes, and even points to a number of plausible candidates, it does not directly test the common causation hypothesis.

By combining the logic and method of the two approaches just discussed, however, the notion that the covariation between distinct problem behaviors reflects specific underlying common causal forces could be directly tested. Such a test would require, first, the estimation of a model, similar to McGee and Newcomb's (1992), in which a higher-order deviance factor was specified to account for the covariation among a set of first-order problem behavior factors. Assuming adequate fit of the higher-order model to the data, a structural model would then be

estimated in which one or more theoretically plausible antecedent variables would be modeled as causes of the higher order deviance factor. By so doing, one could directly assess the magnitude and the direction of the contribution of multiple plausible antecedents to the *general* propensity to engage in a range of risky or problematic behaviors.

In addition to permitting a direct test of the extent to which specific common causes account for the covariation among problem behaviors, this approach also enables the examination of *unique* effects. The ability to examine unique effects is important for several reasons. First, a model that specifies only common causes implies, if taken to its extreme, that explaining a general tendency toward deviance is sufficient to account for a large group of behaviors, and that causes unique to any particular form of deviance are relatively unimportant. Indeed, given a propensity toward deviance, the specific deviant behaviors in which a person engages at any time would be strictly random. This extreme position not only disallows the possibility of unique causes for different deviant behaviors, but also the possibility that problem behaviors could influence one another. An intermediate position, and a more viable one in our opinion, posits that a general cause (or set of causes) is a partial determinant of a range of deviant behaviors, but that unique causes are also important (see Osgood, Johnston, O'Malley, & Bachman, 1988, for a more complete discussion of this issue). The proposed analytic approach allows the specification of both general and specific effects, thereby providing a test of this more tenable, middle ground position.

Despite the potential utility of this approach, only one prior study has used this approach. Newcomb and McGee (1991) examined sensation-seeking as a predictor of a higher-order general deviance factor identified by first-order factors assessing sexual behavior, criminal and

delinquent behavior, licit and illicit substance use, law abidance, social conformity, and religiosity. They found a robust relationship between sensation-seeking and their general deviance factor, thereby suggesting that sensation seeking is a potentially important common cause underlying the covariation among seemingly diverse problem behaviors. Their results also indicated a number of plausible unique, or specific, effects that were identified on the basis of post-hoc modification indices. Thus, while their study represents a pioneering effort along these lines, there is a need to replicate their findings in other samples, particularly the unique effects, all of which were identified on a post-hoc basis, as well as to extend this approach to include a more complete set of plausible underlying causes.

The present study, therefore, seeks to replicate the higher-order factor structure of problem behavior and the direct effect of sensation-seeking on that higher-order factor in a large, representative sample of Black and White adolescents, aged 13 to 19 years. We will also extend these findings to include two additional plausible antecedent variables, negative affect and maladaptive forms of emotion coping. These were included to test the widely held view that externalizing or acting out behaviors, such as substance use, delinquency and so on, reflect outward manifestations of internally experienced distress or, alternatively, maladaptive efforts to cope with that distress (e.g., Blatt, 1991; Dohrenwend & Dohrewend, 1976; Gjerde, Block, & Block, 1988).

Method

Sample and procedures

Data for the present study were derived from a random sample of 2052 Black and White adolescents, 13 to 19 years of age. Random-digit-dial techniques were used to identify this

sample, which represented 81% of all eligibles. (Eligibles were defined as adolescents between the ages of 13 and 19 years at the time of screening who resided within the city limits of Buffalo, NY.) Telephone exchanges concentrated in primarily black areas of the city were intentionally over-sampled, thus yielding a final sample that over-represented both Blacks (44% in the sample vs. 31% in the city as a whole) and other racial groups (8% vs. 5%). Face-to-face interviews were conducted by 30 professionally trained interviewers using a structured interview schedule that contained both interviewer- and self-administered portions. Interviewers and respondents were always matched on sex and, when possible, on race (about 75% of the cases). Average interview length was two hours, and respondents were paid $25 for participation (see Cooper, 1994; Cooper, Peirce, & Huselid, 1994, for additional details). 1978 adolescents who had complete data on all measures were included in the present analyses. The average age of these adolescents was 16.7 years (SD = 2.0). Males (n = 981) and females (n = 997) were roughly evenly represented in this subset, and racial composition closely matched that of the full sample (49% White, 44% Black, and 8% other).

Measures

Four clusters of problem behaviors were assessed.

Sexual behavior was identified by: (1) the number of lifetime sexual partners; (2) a count of the number of risky sexual practices in which the respondent had ever engaged, including having sex with an IV drug user, a promiscuous partner, or a stranger; and (3) a count of two adverse outcomes associated with sexual risk-taking (having ever had an STD, having ever had a pregnancy or pregnancy scare).

Substance use was identified by the following measures: (1) a composite of two items assessing the usual quantity of alcohol consumed on drinking occasions and the frequency of drinking to intoxication ($\alpha = .87$); (2) a count of the number of different drugs ever used, including marijuana or hashish, crack or cocaine, "any drug not prescribed by a doctor that you shoot with a needle" and "any other drug that you take to get high or feel good" (mostly hallucinogens); and (3) a three-level smoking variable where 0 = do not currently smoke, 1 = smoke fewer than 10 cigarettes a day, and 2 = smoke 10 or more cigarettes a day.

Delinquent behaviors were assessed by three composites: (1) a count of the number of property-related crimes (breaking and entering, car theft, shoplifting, and fire-setting) in which the adolescent had ever engaged; (2) a similar count of the number of violent behaviors (fist fights, gang fights, causing injury to another person, and use of weapons); and (3) a count of the number of truant acts (skipping school, suspension or expulsion, running away from home, and staying out all night).

Educational underachievement was identified by: (1) average grades received in school where 1 = mostly As and 8 = mostly Ds and Fs; (2) total number of years held back in school, adjusted among dropouts to include the number of years that they dropped out *before* completing the 12th grade (e.g., a person who was held back two years in school *and* dropped out in the 10th grade would receive a score of 4); and (3) educational aspirations coded as the highest year in school the respondent expected to complete (reverse scored to maintain consistency across indicators).

Three predictor variables were used in the substantive portion of our model test. A broadly defined construct assessing sensation seeking and impulsivity was formed by

compositing two scales. Thrill and adventure seeking assesses the preference for engaging in dangerous, adventurous, reckless, or risky behaviors, and was measured by a 5-item scale (Bernstein, Hoffman, Santiago, & Diebolt, 1989). Impulsivity, measured by a 7-item subscale from the NEO-PI (Costa & McCrae, 1985), assesses the tendency to act hastily and without thought, as well as the inability to resist urges and cravings (α = .70 for the two-scale composite). Maladaptive forms of emotion coping was assessed with a composite of three scales: the Anger-In and Anger-Out subscales from Spielberger's Anger Expression Scale (Spielberger et al., 1985) and Avoidance Coping from the Health and Daily Living Form Coping Response Index (Moos, Cronkite, Billings, & Finney, 1986). Collectively these measures assess what can be broadly described as avoidant forms of emotion coping in that each represents a failure to confront a problem by denying its existence, minimizing its severity, diverting attention away from it, venting one's negative feelings, or some combination of these (α = .68 for the composite; see Cooper, Frone, Russell, & Mudar, 1995, for additional detail). Finally, negative affect was assessed by a composite of three subscales from the Brief Symptom Index (Derogatis & Melisaratos, 1983): depression, general anxiety, and hostility (α = .81).

Results

Modeling the structure of problem behaviors

Two nested models were estimated to determine whether a single higher order latent variable could adequately account for covariation among a set of four first-order latent factors representing delinquency, educational underachievement, sexual behavior, and substance use. Analyses were conducted with the EQS structural equations program (Bentler, 1989). Because several of our measures were non-normally distributed, robust estimation procedures were used.

Multiple fit indices were used as guides to evaluate goodness-of-model fit, including the Normed Fit Index (NFI), the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), and the robust CFI. These statistics range from 0 to 1, with values in excess of .90 indicating an adequate fit of the model to the data. The standardized root mean square residual (RMSR), using off-diagonal elements only, is also reported; RMSR values smaller than .05 to .06 are generally thought to indicate good fit. Finally, χ^2 statistics are reported. A non-significant χ^2 indicates a close fit between the variance-covariance matrix implied by the model and the observed data. However, because χ^2 is sensitive to sample size, even trivial differences between the reproduced and observed matrices can be statistically significant. Thus, with large sample sizes such as the present one, other indicators may provide more reliable guides to the adequacy of model fit.

First, we specified and tested a model in which each of four latent variables was assumed to cause responding on a set of three manifest variables hypothesized to indicate that construct. One of the three loadings on each of the four latent factors was fixed to 1, and the remaining two were freely estimated. Correlations among errors and cross-factor loadings were constrained to 0, but correlations among all first-order latent factors were freely estimated.

As shown in Table 1, results of this initial model test indicated a good fit to the data; values for the CFI, NFI, and NNFI were all greater than .90, and the RMSR was substantially less than .05. Although the χ^2 statistic was significant, this would appear to reflect relatively small differences between the reproduced and observed matrices that were nonetheless statistically significant due to our large sample size.

As shown in Figure 1, all measured variables had statistically significant factor loadings in the expected directions on the first-order constructs. Nonetheless, there was substantial

variability in the degree to which the underlying factors accounted for variance in the individual manifest indicators. Indeed, the average percentage of variance accounted for in the three manifest indicators by the first-order latent constructs ranged from 32% for the educational underachievement factor to 54% for the sexual behavior factor. Finally, all correlations among the first-order factors were statistically significant, and ranged in magnitude from what Cohen would consider a medium (.31 between substance use and educational underachievement) to a large (.73 between substance use and delinquency) effect.

Next we estimated a higher-order factor model that was identical to our initial model in every way except that a single higher-order factor was specified to capture the common variance among the four first-order factors (thus, replacing the factor inter-correlations themselves). As shown in Table 1, a significant χ^2 difference test indicated that the higher-order model provided a significantly poorer fit to the data than the correlated four-factor model. In contrast, however, the remaining fit indices supported the validity of the higher order factor model. There was almost no decrement in fit across any of the multiple fit indices (average decrement across four fit indices = .0025), and the magnitude of the average standardized residual was unchanged. Based on these model comparisons, it seems reasonable to accept the higher-order model, even though it is slightly inferior on purely statistical grounds. It not only provides a more parsimonious account of the inter-relationships among the first-order factors than the alternative model, but it also accounts for the bulk of covariation among the first-order constructs.

As shown in Figure 2, all first-order factors had significant and substantial loadings on the higher-order factor. The higher-order factor accounted for 20% of the variance in the educational underachievement construct, 56% of the variance in the sexual behavior construct,

69% of the variance in the substance use construct, and 77% of the variance in the delinquency construct. Thus, delinquency and substance use appear to be the two factors most strongly determined by the higher-order factor, whereas educational underachievement is the least well-explained. Finally, all 12 loadings on the first-order factors were significant, and only one fell below .50 (pregnancy/STD = .49).

Substantive models

Having determined that covariation among the four problem behavior factors was adequately represented by a single higher order factor, we then specified a model in which the higher-order deviance factor was estimated from three correlated variables reflecting negative affect (depression, hostility, anxiety), maladaptive emotion coping (anger-in, anger-out, avoidance coping), and sensation seeking/impulsivity. Following procedures outlined by Bollen (1989), we corrected these predictor variables for measurement error by setting the error variance associated with each variable to the product of its variance and the quantity 1 minus its estimated reliability.[1]

Results of the analysis indicated that this common effects model provided an adequate fit to the data (see Table 2). Although the NNFI fell just below .90, the remaining three fit indices exceeded .90, and the RMSR was well below .05. Figure 3 presents the results of this model test.

As shown in Figure 3, sensation seeking/impulsivity was significantly positively related to the higher order deviance factor, thus replicating (using an even broader construct) the previous finding reported by Newcomb and McGee. In addition, avoidance coping was also significantly positively related to the higher order deviance factor, although negative affect was not. However, given the substantial, positive correlation between negative affect and maladaptive

coping (r = .67), it is plausible that negative affect *indirectly* contributes to the general deviance factor. If we are willing to assume that the experience of negative affect *drives* coping activities -- a position that has substantial theoretical and empirical support (see, e.g., Folkman & Lazarus, 1988) -- these data can be interpreted to mean that the experience of negative affect elicits various forms of avoidance coping which, in turn, fuels a general propensity to engage in a wide range of deviant behaviors. Thus, one plausible interpretation of these results is that the covariation among externalizing symptoms represents, at least in part, maladaptive efforts to cope with distress and, in part, high sensation seeking needs and poor impulse control. In fact, together these effects accounted for almost one-quarter (23%) of the variance in the higher order deviance factor. Finally, it is worth noting that the addition of our three predictor variables resulted in only minor fluctuations in the loadings of the first-order factors on the higher-order factor from those obtained in our measurement model (Figure 2), thus suggesting at least moderate stability in these parameter estimates.

Despite the generally good fit of the common effects model to the data, the χ^2 statistic indicated that significant unexplained covariation remained in the data (χ^2 = 737.2 with 83 *df*, p < .001). Thus, consistent with our prior discussion, we examined the modification indices to identify plausible unique effects that might be added to the common effects only model. The two largest residuals indicated that freeing paths from negative affect --> sexual behavior, and from coping --> sexual behavior, would result in significantly improved model fit. We also freed the path from sensation seeking --> the manifest indicator of alcohol use. Even though this was not the next largest residual, we freed this path to determine whether we could replicate the only unique effect identified by Newcomb and McGee (1991) that was robust across multiple waves

in their data. As shown in Table 2, the modified model offered a significant improvement in fit over the common effects only model, although it did not fully account for patterns of covariation in the data either (as indicated by a significant model χ^2). The modified model, including both specific and common effects, is shown in Figure 4.

As shown in Figure 4, all three unique effects were significant, although their absolute magnitude was small. Both coping and negative affect were significantly *negatively* related to sexual behavior, thereby raising the possibility that sexual behavior, more so than the other behavior clusters, reflects developmentally appropriate and adaptive processes as well as dysfunctional ones. This argument has in fact been made by Ketterlinus and colleagues (Ketterlinus, Lamb, & Nitz, 1994) and others (Allen, Leadbeater, & Aber, 1994; Rotheram-Borus, 1995). In contrast, sensation seeking/impulsivity was significantly *positively* related to alcohol use, thus replicating Newcomb's earlier finding that sensation seeking directly predicts licit drug use (including both alcohol and tobacco use in their model). This finding suggests that sensation seeking/impulsivity may be more important determinants of alcohol use than of the other behaviors or behavior clusters. Finally, it is also worth noting that despite the freeing of these three parameters, all remaining parameter estimates were highly similar to those obtained in the common effects only model.

Discussion

The present study investigated the higher-order factor structure of problem behaviors, and the common and unique predictors of these behaviors. A number of conclusions are supported by these data. First, consistent with general deviance theories, a single higher-order factor was shown to account for the bulk of the covariation among the first-order problem behavior factors.

Despite this fact, however, a significant χ^2 difference test between the fully correlated first-order factor model and the higher-order factor model suggests that common causal explanations, as advanced by general deviance theories, cannot fully account for the covariation among problem behaviors. Thus, other possibilities must be considered if we wish to fully account for the data.

One such possibility is that a common cause (or causes) shared between two, or even among three, of the problem behavior clusters, *but not by all four*, was omitted. An examination of the modification indices suggested two possibilities consistent with this interpretation. We therefore estimated two additional models to evaluate these possibilities, one in which disturbances between the first-order sexual behavior and substance use factors were allowed to correlate, and the other in which disturbances between the education and delinquency factors were allowed to correlate. These models were statistically indistinguishable from each other, as well as from the correlated four factor model. Importantly, however, allowing these disturbances to correlate, while improving overall model fit, did not alter substantially any of the parameter estimates for the higher-order factor model depicted in Figure 2. Thus, although it seems plausible, on the bases of these supplemental analyses, that two of these behaviors share an underlying cause or causes not shared with the other behaviors, this appears in no way to challenge the explanatory potency of the single higher-order deviance factor.

The possibility of partially shared causes does not, however, exhaust the universe of plausible models that might more fully account for the patterns of covariation in our data. It is clearly possible, for example, that problem behaviors causally affect one another. This interpretation is consistent with evidence from several prospective studies showing lagged effects of one problem behavior on another (e.g., alcohol and drug use on sexual behavior; see Mott &

Haurin, 1987; Rosenbaum & Kandel, 1990; also see Elliot et al., 1989, for evidence on prospective relationships among poor school performance, delinquency, and drug use). Alternatively, it is also possible that deviance is multi-factorial, or both multi-factorial and complex. For example, it may be that distinct subtypes of deviance exist, and that these subtypes are correlated. Consistent with this possibility, both social (comprising substance use and sexual behavior) and anti-social (comprising low educational achievement and delinquency) deviance clusters have been described in the literature (cite).

Yet another possibility is that single-group factor models are inappropriate. Such models assume that a single factor structure characterizes the functional relationships among the variables for each person in the population. There is clear indication, however, that the structural relationships among problem behaviors may vary across gender, race, and age groups during adolescence (see, e.g., Gillmore, Hawkinds, Catalano, et al., 1991; McGee & Newcomb, 1992; Rosenbaum & Kandel, 1990). This clearly points to the need to test the invariance of the factor structure across these subgroups. Even multi-group models may fail, however, to clearly delineate the component parts of overall deviance to the extent that reliable deviant subtypes exist that do not overlap with these demographic subgroups. For example, Loeber (1985) postulates that two distinct deviant subtypes exist: (1) a generalist who is prone to engage in multiple types of deviant behavior, and (2) a specialist who tends to engage in only one type of deviant or antisocial behavior. Clearly, the general deviance model would fit well for the former subgroup, but not for the latter. Thus, future research will need not only to consider more carefully possible differences in factor structure across distinct demographic subgroups in the population, but also the use of other analytic approaches (e.g., latent class analysis) that could

more reliably identify important deviant subtypes across which the structure of problem behavior might differ.

A second major issue concerns the capacity of this model to account for variability in problem behaviors. As previously indicated, on average, a little more than half of the variance in the first-order factors was accounted for by the higher order deviance factor. This clearly suggests that common causes are important determinants of a range of phenotypically distinct problem behaviors. Moreover, our structural model suggests that sensation seeking needs, poor impulse control, and dysfunctional ways of coping with negative emotions each contribute importantly to a general propensity to engage in a wide range of deviant behaviors. Accordingly, intervention efforts aimed at providing more adaptive ways of meeting sensation seeking needs and of coping with negative emotions could have far-reaching consequences. Nevertheless, these factors accounted for only about one-quarter of the variance in the higher order factor, suggesting the need to consider a broader range of plausible common causes in future research.

Although substantial variability in the first-order problem behavior factors was explained by the higher order factor, important differences were observed in the amount of variability explained in individual problem behaviors. Specifically, substance use and delinquency appeared to be much more strongly determined by this general deviance factor than were sexual behavior and, in particular, low educational achievement. While we cannot rule out the possibility that the differential predictive validity of our model stemmed from differences in the quality of our measures, it is also plausible that unique causes are more important determinants of sexual behavior (as previously argued) and of educational underachievement than they are of delinquency and substance use. It is also important to point out that, even for those problem

behaviors where we explained the most variance, statistically significant unaccounted-for variability remained. Considered collectively, these data underscore the potential importance of considering both unique and common causes of deviant behaviors. Nonetheless, concern has been expressed about techniques commonly used to identify unique effects that may unduly capitalize on chance associations in the data (Stacy, Newcomb, & Bentler, 1991), thus leading to non-replicable effects. This issue could be at least partially addressed in future research by relying on theory to generate a priori hypotheses regarding the nature of both common and specific effects. In addition, the inclusion of a combination of predictors that, on a priori grounds, would be expected to exert common influences only (e.g., holding a liberal ideology), unique influences only (e.g., family history of psychopathy or of alcoholism), or a combination of both (e.g., sensation seeking) would lead to the development of more highly constrained and parsimonious models, which in turn should enhance the stability and likely replicability of parameter estimates of both types of effects.

Finally, limitations associated with the self-report and cross-sectional nature of our data must be acknowledged. Future research using longitudinal or prospective designs would help to mitigate both concerns, however. Use of such designs would enhance our ability to distinguish among competing alternative explanations for our data. In addition, the ability to model correlated errors across time would also help to control, at least partially, method variance that may be contributing to the covariation among problem behaviors observed in our cross-sectional data.

In sum, these issues notwithstanding, the general deviance model appears to provide a highly parsimonious explanation for the covariation among problem behaviors and, actuarily

speaking, also accounts for a large proportion of their covariation as well as substantial portions of the variability in problem behaviors. Thus, although important substantive and methodological issues remain to be explored, the present study suggests that this analytic approach holds much promise, and also that general deviance models -- despite their limitations -- offer important explanatory frameworks for continuing efforts to understand the etiology of problem behaviors.

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Endnotes

1. We elected to use this approach rather than a latent variables approach for three reasons. First, unlike the problem behavior variables, we are not substantively interested in the factor structure of our predictor variables. Second, we did not want to confound the fit of our structural model with the fit of our measurement model, and 'unconfounding' them would introduce yet another step into what is an already complex analytic process. Finally, there is evidence that the so-called pseudo-latent variables approach we are using for our predictor variables yields results that are highly similar to those from a full-blown latent variables approach (see Netemeyer, Johnston, & Burton, 1990, for details). In sum, we felt that modeling our predictors as latent variables would have needlessly complicate this paper.

Table 1. Summary Of χ^2 And Fit Statistics For Alternative Measurement Models

	χ^2	Satorra-Bentler χ^2	df	NFI	NNFI	CFI	Robust CFI	RMSR
Correlated 4 Factor Model	504.0	402.4	48	.924	.905	.931	.927	.037
Higher Order Model	524.4	420.7	50	.921	.905	.928	.923	.037
$\Delta \chi^2$	20.4		2					

Table 2. Summary Of χ^2 And Fit Statistics For Common Effects Only Model vs. Common and Unique Effects Model

	χ^2	Satorra-Bentler χ^2	df	NFI	NNFI	CFI	Robust CFI	RMSR
Common Effects Only Model	737.2	622.9	83	.907	.894	.916	.912	.039
Common and Unique Effects Model	642.2	540.4	80	.919	.906	.928	.925	.037
$\Delta \chi^2$	95.0		3					

Figure Caption

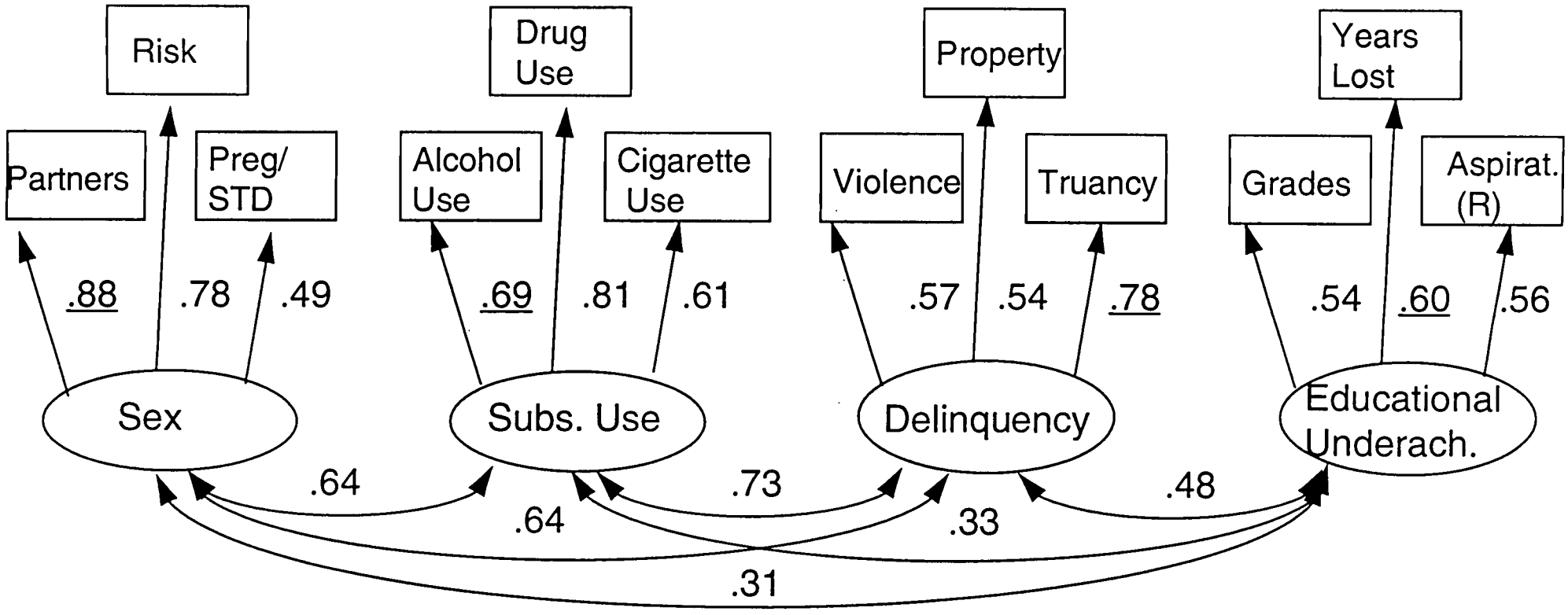
Figure 1. Correlated four factor model of problem behavior clusters.

Figure 2. Higher order factor model.

Figure 3. Common effects only model.

Figure 4. Common and unique effects model.

Figure 1. Correlated Four Factor Model of Problem Behavior Clusters



Note. Standardized results are reported. Significance of underlined loadings could not be estimated because the corresponding unstandardized loading was set to 1. All estimated loadings and correlations were significant at $p < .001$.

Figure 2. Higher Order Factor Model

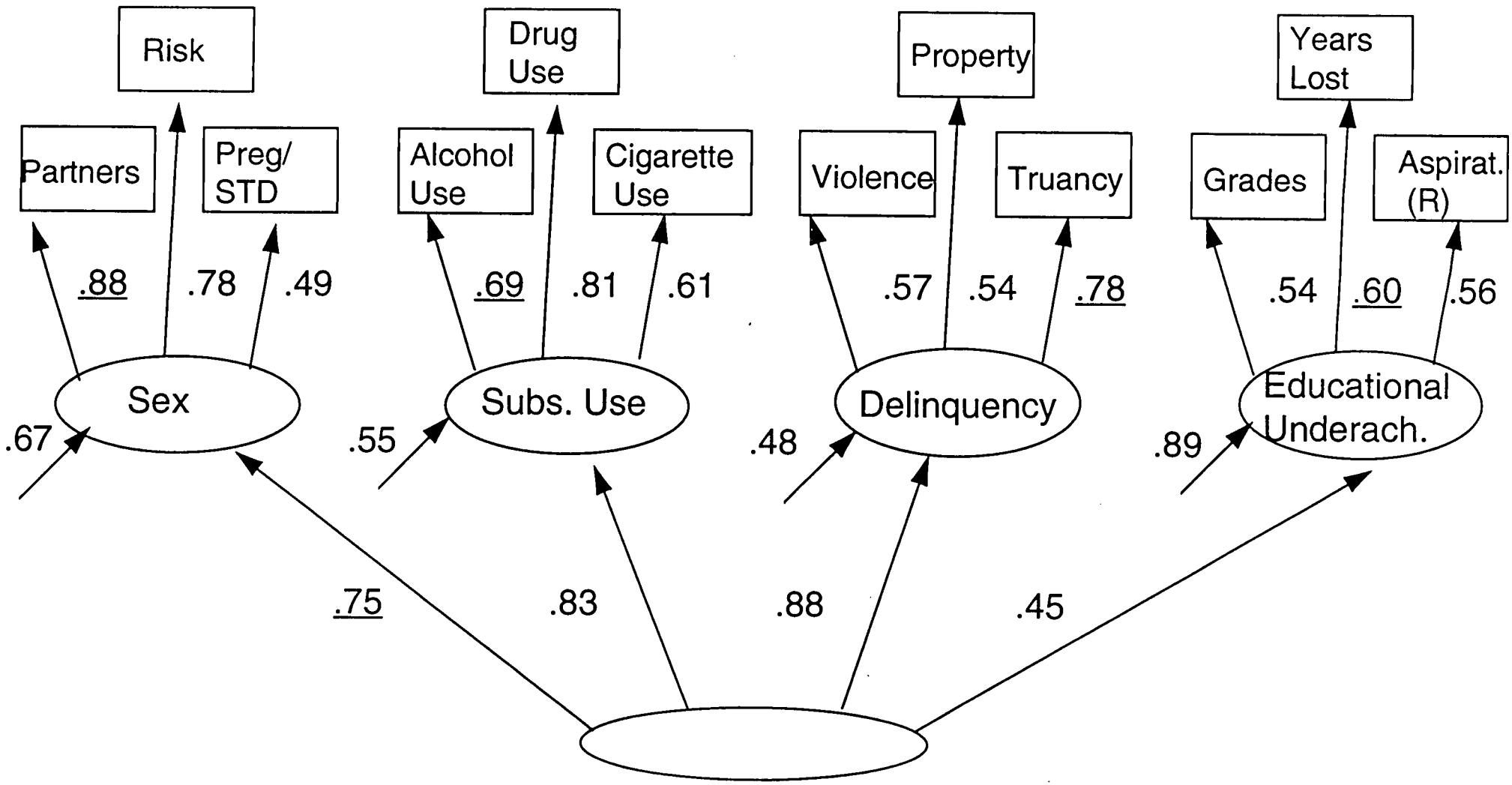


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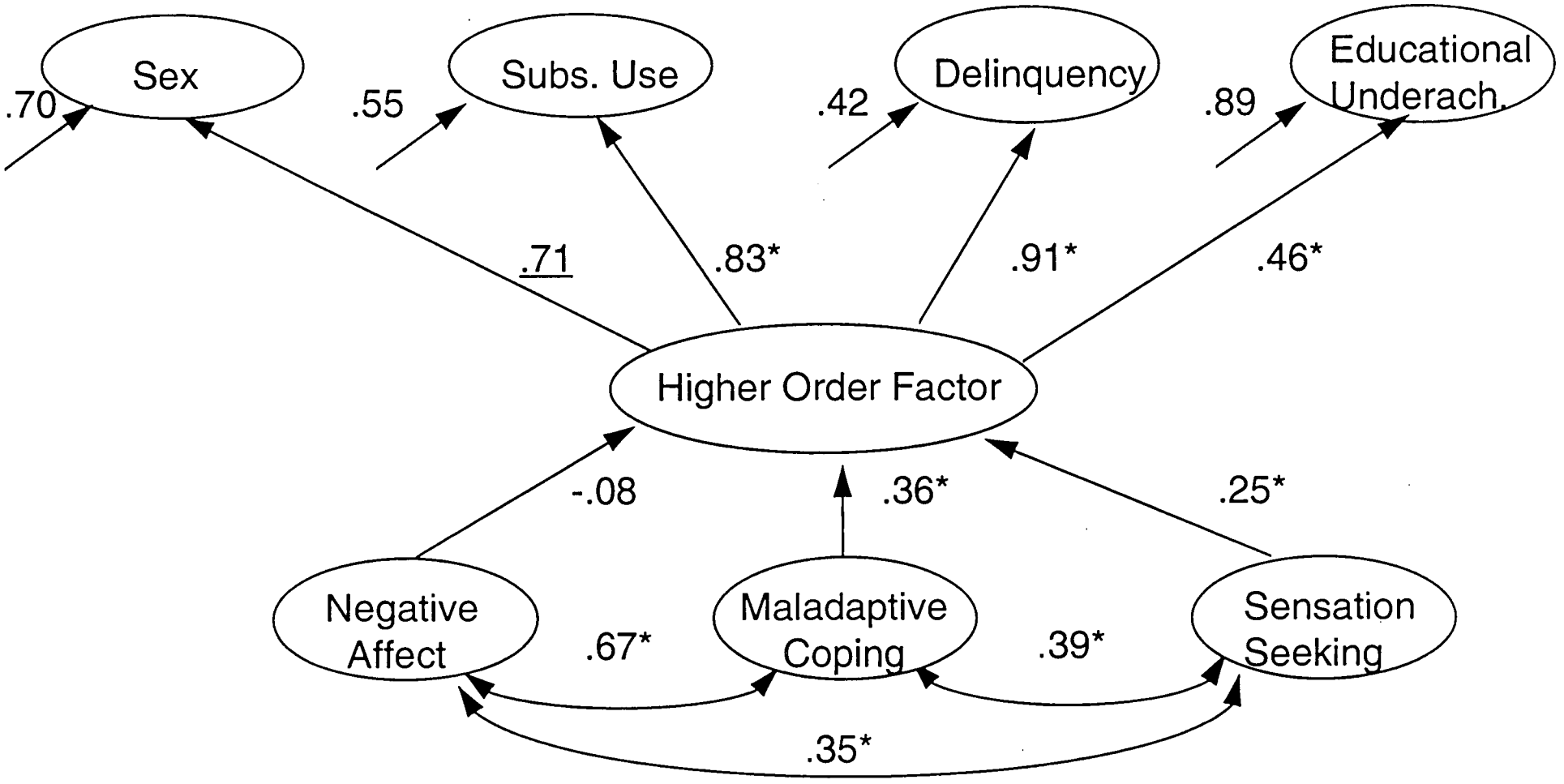
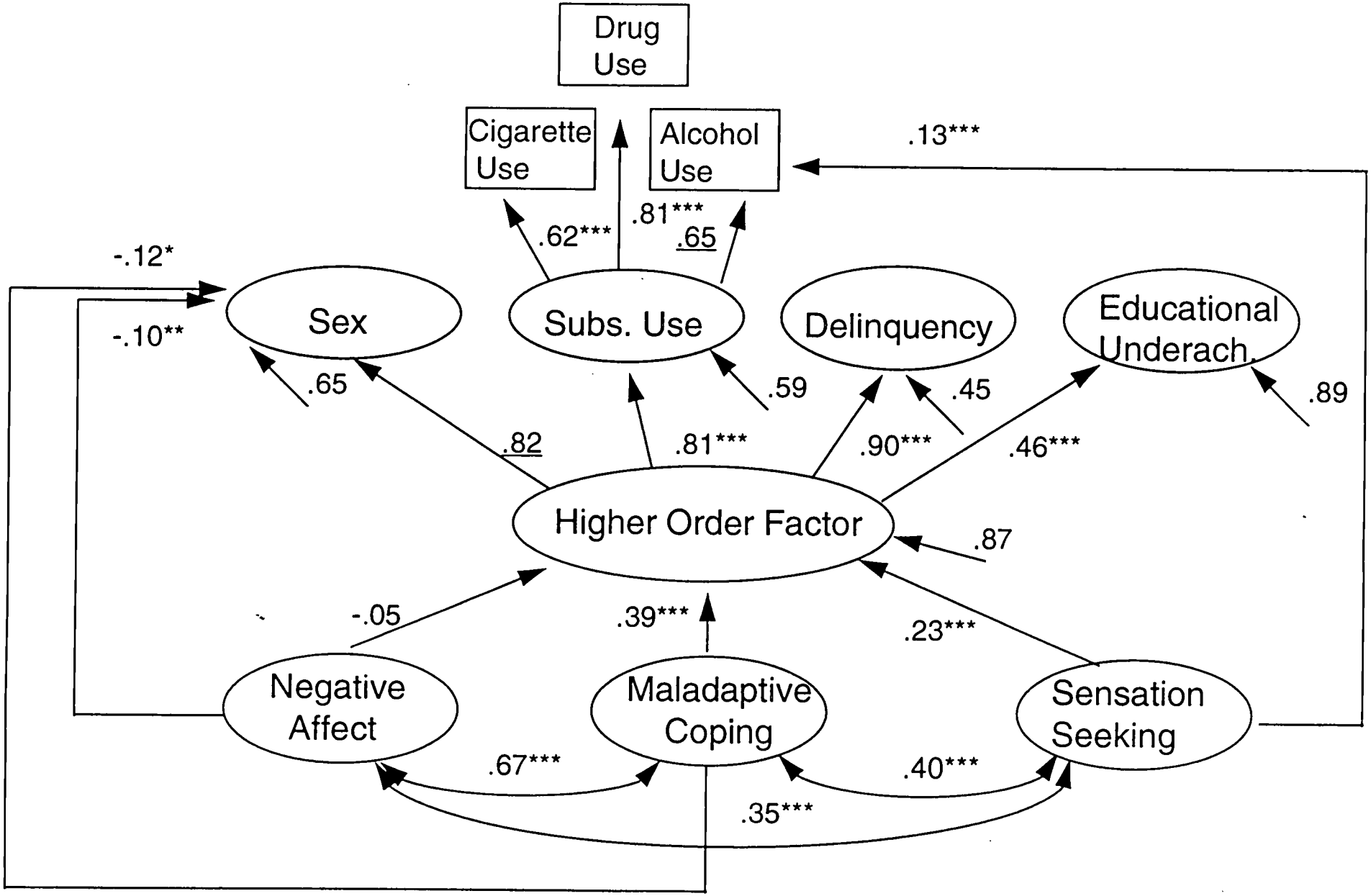
Figure 3. Common Effects Only Model



Note. Standardized results are reported. Significance of underlined loadings could not be estimated because the corresponding unstandardized loading was set to 1. *$p < .001$

Figure 4. Common and Unique Effects Model



Note. Standardized results are reported. Significance of underlined loadings could not be estimated because the corresponding unstandardized loading was set to 1. *p < .05; **p < .01; ***p < .001

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